



Third Semester B.E./B.Tech. Degree Examination, June/July 2026 Analog and Digital Electronics

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks, L: Bloom's level, C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Explain First Order Low Pass Filter and derive the gain and phase angle equation.	10	L3	CO1
	b.	Design a low pass filter at cutoff frequency of 2 KHz with a passband gain 2. Using frequency scaling technique converts 2 KHz cutoff frequency to 2.6KHz. Assume $C = 0.01 \mu F$. Also draw frequency response curve.	10	L3	CO1
OR					
Q.2	a.	Elucidate the design of Narrow band Pass filter with specifications and explain significance of using 2 filter design with necessary equations.	10	L3	CO1
	b.	Design a wideband pass filter with $f_L = 400 \text{ Hz}$ and $f_H = 2 \text{ KHz}$ and a pass band gain equal to 6. Draw the frequency response wave and calculate the value of 2 for the filter. Assume $C = 0.0047 \mu F$.	10	L3	CO1
Module – 2					
Q.3	a.	What is Comparator? With a neat diagrams and wave form explain zero crossing detector.	10	L2	CO2
	b.	Elucidate the operation of Schmitt trigger circuit with waveform. Also derive its hysteresis voltage V_{hy} equation.	10	L3	CO2
OR					
Q.4	a.	With the help of neat sketch analyze the working of Inverting Comparator.	10	L2	CO2
	b.	Design and explain the working of RC phase shift oscillator for $f_0 = 1 \text{ KHz}$.	10	L3	CO2
Module – 3					
Q.5	a.	Elucidate the operation of an astable multivibrator with the help of a well labeled diagram and output waveform. Additionally, derive the expression for the total time period and duty cycle.	10	L3	CO5
	b.	With the help of neat sketch, explain 555 timer architecture with the operation of each pin.	10	L2	CO5

OR

Q.6	a.	Explain the operation of 555 timer as a monostable multivibrator and derive the expression for the pulse width.	10	L3	CO5
	b.	Explain with a neat diagram and waveform squarewave oscillator.	10	L2	CO5

Module – 4

Q.7	a.	Using K-map solve the following : i) $F(r, s, t, u) = \Sigma(1, 3, 4, 6, 9, 11, 12, 14)$ ii) $F = \overline{A}C + \overline{A}B + A\overline{B}C + BC$	10	L3	CO5
	b.	Construct 8:1 multiplexer using 4 :1 multiplexer and explain the operation with truth table.	10	L3	CO5

OR

Q.8	a.	What is Encoder? Realize octal to binary encoder using basic gates and write its truth table.	10	L3	CO5
	b.	Design and explain BCD to Decimal decoder.	10	L3	CO5

Module – 5

Q.9	a.	Explain the operation of clocked D flip-flop. Also derive characteristics equation from truth table.	10	L3	CO6
	b.	Design a 3 bit synchronous binary counter with timing diagram.	10	L3	CO6

OR

Q.10	a.	With neat sketch, explain the operation of clocked JK flip-flop. Also derive characteristics equation for it.	10	L3	CO6
	b.	Design a 4 bit binary ripple counter using T flip-flop, also sketch the state diagram and timing diagram.	10	L3	CO6
